**Appendix IV.** Full model coefficients from multivariable models depicted in Table 5 (Model III) and Figure 1 (knee replacement upper part / hip replacement lower part); ORs for binary variables, for continuous outcomes exponentiated coefficients from the log model depicting % change compared to reference.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Knee Replacements** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | **Oral Morphine Equivalents** | | | **Length of Hospital Stay** | | | **Cost of Hospitalization** | | | **Cardiac/Respiratory Complications Combined** | | | **Blood Transfusion/ Intensive Care Unit Admission Combined** | | |
|  |  | **OR** | **95% CI** |  | **OR** | **95% CI** |  | **OR** | **95% CI** |  | **OR** | **95% CI** |  | **OR** | **95% CI** |  |
| **Age\*** |  | -2.11 | -2.17 | -2.05 | 0.47 | 0.45 | 0.48 | 0.01 | -0.01 | 0.03 | 1.03 | 1.03 | 1.03 | 1.02 | 1.02 | 1.02 |
| **Sex** | Female | -3.03 | -3.91 | -2.14 | 2.90 | 2.64 | 3.15 | -1.04 | -1.31 | -0.77 | 1.13 | 1.09 | 1.18 | 1.24 | 1.22 | 1.27 |
|  | Male (reference) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **Race** | White (reference) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
|  | Black | -0.71 | -2.44 | 1.06 | 6.78 | 6.26 | 7.31 | 2.13 | 1.58 | 2.68 | 0.82 | 0.75 | 0.89 | 1.16 | 1.12 | 1.21 |
|  | Hispanic | -1.31 | -5.33 | 2.88 | 3.22 | 2.04 | 4.42 | 1.57 | 0.28 | 2.87 | 1.09 | 0.92 | 1.29 | 1.00 | 0.92 | 1.08 |
|  | Other | -6.83 | -8.31 | -5.32 | 0.95 | 0.50 | 1.40 | 1.31 | 0.81 | 1.81 | 1.00 | 0.94 | 1.07 | 1.06 | 1.03 | 1.10 |
| **Insurance Type** | Commercial (reference) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
|  | Medicaid | 12.20 | 9.07 | 15.42 | 9.15 | 8.29 | 10.01 | 0.97 | 0.10 | 1.85 | 1.27 | 1.12 | 1.43 | 1.04 | 0.97 | 1.10 |
|  | Medicare | 5.78 | 4.53 | 7.04 | 1.70 | 1.36 | 2.03 | -0.31 | -0.67 | 0.05 | 1.09 | 1.03 | 1.15 | 1.02 | 0.99 | 1.04 |
|  | Uninsured | 8.38 | 1.12 | 16.17 | 7.64 | 5.58 | 9.74 | 1.77 | -0.37 | 3.96 | 1.12 | 0.82 | 1.55 | 0.96 | 0.82 | 1.12 |
|  | Unknown | 3.43 | 0.93 | 5.99 | 4.52 | 3.81 | 5.23 | -0.42 | -1.16 | 0.33 | 1.03 | 0.91 | 1.16 | 0.97 | 0.92 | 1.03 |
| **Hospital Location** | Rural | -5.42 | -16.56 | 7.20 | 0.54 | -3.94 | 5.23 | 6.03 | -1.36 | 13.96 | 0.92 | 0.77 | 1.11 | 0.80 | 0.56 | 1.14 |
|  | Urban (reference) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **Hospital Bed Size\*** |  | 0.01 | -0.02 | 0.03 | 0.01 | 0.00 | 0.02 | 0.00 | -0.01 | 0.02 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| **Hospital Teaching Status** | Non-Teaching | -0.50 | -10.87 | 11.09 | 2.49 | -1.55 | 6.69 | 0.97 | -5.26 | 7.61 | 0.84 | 0.72 | 0.99 | 1.10 | 0.81 | 1.49 |
|  | Teaching (reference) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **Annual Procedure Volume\*** | | 0.00 | -0.03 | 0.02 | -0.01 | -0.02 | -0.01 | -0.01 | -0.02 | 0.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| **Year of Procedure** | 2006 (reference) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
|  | 2007 | -7.27 | -9.18 | -5.31 | -3.33 | -3.89 | -2.77 | 0.99 | 0.35 | 1.64 | 0.99 | 0.91 | 1.08 | 1.08 | 1.03 | 1.12 |
|  | 2008 | -13.42 | -15.19 | -11.60 | -6.30 | -6.83 | -5.75 | -0.95 | -1.57 | -0.32 | 0.89 | 0.82 | 0.97 | 1.04 | 1.00 | 1.08 |
|  | 2009 | -12.94 | -14.71 | -11.15 | -8.85 | -9.37 | -8.34 | -0.77 | -1.39 | -0.16 | 0.89 | 0.82 | 0.97 | 0.92 | 0.88 | 0.96 |
|  | 2010 | -15.90 | -17.58 | -14.19 | -12.11 | -12.60 | -11.63 | -1.90 | -2.50 | -1.30 | 0.92 | 0.85 | 1.00 | 0.86 | 0.82 | 0.89 |
|  | 2011 | -16.64 | -18.32 | -14.93 | -13.77 | -14.24 | -13.28 | -4.60 | -5.18 | -4.01 | 0.82 | 0.76 | 0.89 | 0.74 | 0.71 | 0.78 |
|  | 2012 | -16.95 | -18.63 | -15.22 | -16.63 | -17.10 | -16.17 | -9.08 | -9.63 | -8.52 | 0.79 | 0.73 | 0.86 | 0.63 | 0.60 | 0.65 |
|  | 2013 | -18.22 | -19.93 | -16.46 | -20.00 | -20.44 | -19.55 | -9.75 | -10.31 | -9.20 | 0.76 | 0.70 | 0.83 | 0.46 | 0.44 | 0.48 |
|  | 2014 | -22.85 | -24.53 | -21.12 | -24.80 | -25.23 | -24.36 | -10.49 | -11.05 | -9.92 | 0.65 | 0.59 | 0.70 | 0.32 | 0.30 | 0.34 |
| **General Anesthesia** |  | 15.29 | 13.60 | 17.01 | 4.13 | 3.70 | 4.56 | 4.98 | 4.50 | 5.45 | 1.14 | 1.07 | 1.20 | 1.14 | 1.10 | 1.18 |
| **Peripheral Nerve Block** | | -11.76 | -13.44 | -10.05 | -0.57 | -1.09 | -0.03 | 1.27 | 0.67 | 1.87 | 0.93 | 0.86 | 1.01 | 1.06 | 1.02 | 1.11 |
| **Intravenous Acetaminophen** |  | 4.06 | 2.28 | 5.88 | - | - | - | - | - | - | - | - | - | - | - | - |
| **PCA** |  | 65.95 | 63.77 | 68.14 | - | - | - | - | - | - | - | - | - | - | - | - |
| **NSAIDs** |  | -5.50 | -6.42 | -4.57 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Cyclooxygenase-2 Inhibitors** |  | -8.03 | -8.98 | -7.07 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Ketamine** |  | 7.15 | 4.66 | 9.69 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Pregabalin/Gabapentin** |  | 4.71 | 3.43 | 6.00 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Charlson Comorbidity Index\*** | | 3.68 | 3.06 | 4.31 | 7.67 | 7.50 | 7.85 | 3.95 | 3.76 | 4.14 | 1.41 | 1.39 | 1.44 | 1.21 | 1.20 | 1.23 |
| **History of Substance Use/Abuse** | | 11.75 | 9.98 | 13.56 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Pain Conditions** |  | 15.21 | 13.78 | 16.65 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Psychiatric Comorbidities** |  | 10.17 | 8.93 | 11.43 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Obesity** |  | 3.33 | 2.22 | 4.46 | 4.49 | 4.17 | 4.80 | 2.93 | 2.59 | 3.27 | 1.54 | 1.48 | 1.61 | 1.03 | 1.01 | 1.06 |
| **Sleep Apnea** |  | 3.12 | 1.72 | 4.55 | 3.97 | 3.57 | 4.36 | 2.19 | 1.76 | 2.62 | 1.76 | 1.68 | 1.85 | 1.17 | 1.14 | 1.21 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Hip Replacements** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | **Oral Morphine Equivalents** | | | **Length of Hospital Stay** | | | **Cost of Hospitalization** | | | **Cardiac/Resp Compl Combined** | | | **Blood Transfusion/ ICU Adm Combined** | | |
|  |  | **OR** | **95% CI** |  | **OR** | **95% CI** |  | **OR** | **95% CI** |  | **OR** | **95% CI** |  | **OR** | **95% CI** |  |
| **Age\*** |  | -1.78 | -1.85 | -1.71 | 0.51 | 0.49 | 0.53 | 0.00 | -0.02 | 0.01 | 1.03 | 1.02 | 1.03 | 1.02 | 1.02 | 1.02 |
| **Sex** | Female | -0.60 | -1.84 | 0.65 | 5.50 | 5.07 | 5.94 | 0.08 | -0.23 | 0.38 | 1.03 | 0.97 | 1.09 | 1.58 | 1.54 | 1.62 |
|  | Male (reference) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **Race** | White (reference) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
|  | Black | 1.00 | -1.59 | 3.66 | 8.79 | 7.86 | 9.73 | 2.16 | 1.51 | 2.82 | 0.96 | 0.84 | 1.10 | 1.18 | 1.12 | 1.24 |
|  | Hispanic | -10.83 | -17.57 | -3.53 | 2.58 | -0.05 | 5.28 | 0.79 | -1.15 | 2.76 | 1.07 | 0.76 | 1.52 | 0.93 | 0.81 | 1.08 |
|  | Other | -7.21 | -9.40 | -4.97 | 1.12 | 0.32 | 1.92 | 1.14 | 0.54 | 1.74 | 1.11 | 0.99 | 1.24 | 1.02 | 0.97 | 1.08 |
| **Insurance Type** | Commercial (reference) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
|  | Medicaid | 24.69 | 20.02 | 29.55 | 13.93 | 12.50 | 15.37 | 3.64 | 2.68 | 4.62 | 1.38 | 1.14 | 1.68 | 1.19 | 1.09 | 1.29 |
|  | Medicare | 9.24 | 7.41 | 11.10 | 4.89 | 4.31 | 5.48 | 1.14 | 0.72 | 1.56 | 1.24 | 1.14 | 1.35 | 1.08 | 1.04 | 1.12 |
|  | Uninsured | 7.99 | 0.54 | 16.00 | 8.24 | 5.72 | 10.83 | 1.08 | -0.69 | 2.88 | 1.00 | 0.64 | 1.55 | 1.03 | 0.88 | 1.20 |
|  | Unknown | 5.35 | 1.18 | 9.69 | 6.01 | 4.60 | 7.43 | 1.48 | 0.48 | 2.50 | 1.24 | 1.00 | 1.54 | 1.04 | 0.95 | 1.14 |
| **Hospital Location** | Rural | -4.44 | -17.81 | 11.10 | 0.01 | -5.68 | 6.05 | 5.26 | -3.63 | 14.96 | 0.95 | 0.74 | 1.22 | 0.74 | 0.49 | 1.12 |
|  | Urban (reference) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **Hospital Bed Size\*** |  | 0.01 | -0.02 | 0.04 | 0.01 | 0.00 | 0.02 | 0.01 | -0.01 | 0.02 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| **Hospital Teaching Status** | Non-Teaching | 3.69 | -7.96 | 16.81 | 0.81 | -3.76 | 5.60 | 2.01 | -4.88 | 9.40 | 0.87 | 0.72 | 1.06 | 1.16 | 0.84 | 1.61 |
|  | Teaching (reference) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **Annual Procedure Volume\*** | | -0.03 | -0.06 | 0.01 | -0.03 | -0.05 | -0.02 | -0.01 | -0.03 | 0.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| **Year of Procedure** | 2006 (reference) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
|  | 2007 | -6.10 | -8.92 | -3.20 | -3.74 | -4.70 | -2.77 | 0.89 | 0.14 | 1.65 | 1.00 | 0.87 | 1.16 | 0.96 | 0.90 | 1.01 |
|  | 2008 | -11.52 | -14.17 | -8.79 | -6.61 | -7.54 | -5.67 | -1.94 | -2.67 | -1.21 | 0.94 | 0.82 | 1.09 | 0.95 | 0.90 | 1.01 |
|  | 2009 | -12.70 | -15.23 | -10.08 | -10.07 | -10.93 | -9.20 | -2.50 | -3.19 | -1.79 | 0.99 | 0.87 | 1.14 | 0.80 | 0.76 | 0.85 |
|  | 2010 | -14.21 | -16.67 | -11.68 | -14.05 | -14.86 | -13.23 | -5.02 | -5.69 | -4.34 | 1.01 | 0.88 | 1.16 | 0.70 | 0.66 | 0.74 |
|  | 2011 | -17.68 | -20.04 | -15.26 | -17.31 | -18.09 | -16.53 | -8.06 | -8.70 | -7.41 | 0.92 | 0.80 | 1.05 | 0.63 | 0.59 | 0.66 |
|  | 2012 | -17.64 | -20.02 | -15.20 | -20.22 | -20.97 | -19.47 | -13.75 | -14.35 | -13.14 | 0.84 | 0.73 | 0.96 | 0.50 | 0.48 | 0.53 |
|  | 2013 | -20.08 | -22.45 | -17.63 | -24.78 | -25.48 | -24.07 | -14.44 | -15.04 | -13.83 | 0.73 | 0.63 | 0.83 | 0.35 | 0.33 | 0.38 |
|  | 2014 | -26.05 | -28.32 | -23.70 | -29.82 | -30.49 | -29.14 | -14.88 | -15.49 | -14.26 | 0.69 | 0.60 | 0.79 | 0.27 | 0.25 | 0.28 |
| **General Anesthesia Use** |  | 23.02 | 20.33 | 25.77 | 5.22 | 4.46 | 5.99 | 4.35 | 3.78 | 4.92 | 1.11 | 1.00 | 1.22 | 1.25 | 1.19 | 1.31 |
| **Peripheral Nerve Block Use** | | -10.35 | -13.52 | -7.07 | -2.96 | -4.11 | -1.80 | -0.98 | -1.86 | -0.09 | 0.82 | 0.70 | 0.97 | 0.88 | 0.81 | 0.95 |
| **Intravenous Acetaminophen** |  | 6.87 | 4.30 | 9.50 | - | - | - | - | - | - | - | - | - | - | - | - |
| **PCA** |  | 67.62 | 64.46 | 70.83 | - | - | - | - | - | - | - | - | - | - | - | - |
| **NSAIDs** |  | -5.68 | -7.00 | -4.34 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Cyclooxygenase-2 Inhibitors** |  | -10.67 | -11.98 | -9.33 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Ketamine** |  | 8.48 | 5.00 | 12.08 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Pregabalin/Gabapentin** |  | 2.16 | 0.36 | 4.00 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Charlson Comorbidity Index\*** | | 5.38 | 4.51 | 6.26 | 9.14 | 8.85 | 9.43 | 4.53 | 4.32 | 4.73 | 1.40 | 1.37 | 1.43 | 1.26 | 1.24 | 1.28 |
| **History of Substance Use/Abuse** | | 15.03 | 12.77 | 17.32 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Pain Conditions** |  | 17.61 | 15.65 | 19.60 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Psychiatric Comorbidities** |  | 14.20 | 12.33 | 16.10 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Obesity** |  | 7.49 | 5.67 | 9.35 | 5.76 | 5.17 | 6.36 | 2.85 | 2.42 | 3.28 | 1.43 | 1.33 | 1.54 | 0.93 | 0.90 | 0.97 |
| **Sleep Apnea** |  | 7.97 | 5.61 | 10.39 | 4.70 | 3.94 | 5.47 | 2.61 | 2.05 | 3.17 | 1.85 | 1.69 | 2.01 | 1.20 | 1.14 | 1.26 |

\*variable entered into model as continuous